

# 6L6-GC

## Beam Power Tube

### GENERAL DATA

#### Electrical:

Heater, for Unipotential Cathode:

|                               |           |       |
|-------------------------------|-----------|-------|
| Voltage (AC or DC) . . . . .  | 6.3 ± 10% | volts |
| Current at 6.3 volts. . . . . | 0.9       | amp   |

Direct Interelectrode Capacitances

(Approx.):<sup>▲</sup>

|                                                                      |     |    |
|----------------------------------------------------------------------|-----|----|
| Grid-No.1 to plate. . . . .                                          | 0.6 | μf |
| Grid-No.1 to cathode & grid No.3,<br>grid No.2, and heater . . . . . | 10  | μf |
| Plate to cathode & grid No.3,<br>grid No.2, and heater . . . . .     | 6.5 | μf |

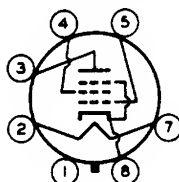
#### Characteristics, Class A<sub>1</sub> Amplifier:

|                                      |       |       |
|--------------------------------------|-------|-------|
| Plate Voltage . . . . .              | 250   | volts |
| Grid-No.2 Voltage . . . . .          | 250   | volts |
| Grid-No.1 Voltage . . . . .          | -14   | volts |
| Plate Resistance (Approx.) . . . . . | 22500 | ohms  |
| Transconductance. . . . .            | 6000  | μmhos |
| Plate Current . . . . .              | 72    | ma    |
| Grid-No.2 Current . . . . .          | 5     | ma    |

#### Mechanical:

|                                             |                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Position. . . . .                 | Any                                                                                                                                                                                                                                                                                                                                     |
| Maximum Overall Length. . . . .             | 4-1/4"                                                                                                                                                                                                                                                                                                                                  |
| Maximum Seated Length . . . . .             | 3-11/16"                                                                                                                                                                                                                                                                                                                                |
| Diameter. . . . .                           | 1.438" to 1.562"                                                                                                                                                                                                                                                                                                                        |
| Bulb. . . . .                               | T-12                                                                                                                                                                                                                                                                                                                                    |
| Base. . . . .                               | Medium-Shell Octal 7-Pin (JEDEC Group 1, No.87-12),<br>Short Medium-Shell Octal 7-Pin with External Barriers<br>Style A (JEDEC Group 1, No.87-111) or<br>Style B (JEDEC Group 1, No.87-119), or<br>Short Medium-Shell Octal 6-Pin with External Barriers<br>Style A (JEDEC Group 1, No.86-148) or<br>Style B (JEDEC Group 1, No.86-122) |
| Basing Designation for BOTTOM VIEW. . . . . | 7AC                                                                                                                                                                                                                                                                                                                                     |

Pin 1 • — No Connec-  
tion  
Pin 2 — Heater  
Pin 3 — Plate  
Pin 4 — Grid No.2



Pin 5 — Grid No.1  
Pin 7 — Heater  
Pin 8 — Cathode,  
Grid No.3

### AF POWER AMPLIFIER — Class A<sub>1</sub>

Maximum Ratings, Design-Maximum Values:

|                                          |     |      |       |
|------------------------------------------|-----|------|-------|
| PLATE VOLTAGE. . . . .                   | 500 | max. | volts |
| GRID-No.2 (SCREEN-GRID) VOLTAGE. . . . . | 450 | max. | volts |
| GRID-No.2 INPUT. . . . .                 | 5   | max. | watts |
| PLATE DISSIPATION. . . . .               | 30  | max. | watts |



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## PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. . 200 max. volts  
Heater positive with respect to cathode. . 200★ max. volts

## Typical Operation and Characteristics:

### Fixed-Bias Operation

|                                     |       |       |       |       |       |
|-------------------------------------|-------|-------|-------|-------|-------|
| Plate Voltage. . . . .              | 200   | 250   | 300   | 350   | volts |
| Grid-No.2 Voltage. . . . .          | 200   | 250   | 200   | 250   | volts |
| Grid-No.1 (Control-Grid)            |       |       |       |       |       |
| Voltage. . . . .                    | -11.5 | -14   | -12.5 | -18   | volts |
| Peak AF Grid-No.1 Voltage. . . . .  | 11.5  | 14    | 12.5  | 18    | volts |
| Zero-Signal Plate Current. . . . .  | 52    | 72    | 48    | 54    | ma    |
| Max.-Signal Plate Current. . . . .  | 57    | 79    | 55    | 66    | ma    |
| Zero-Signal Grid-No.2               |       |       |       |       |       |
| Current. . . . .                    | 3.5   | 5     | 2.5   | 2.5   | ma    |
| Max.-Signal Grid-No.2               |       |       |       |       |       |
| Current. . . . .                    | 5.7   | 7.3   | 4.7   | 7     | ma    |
| Plate Resistance (Approx.). . . . . | 35000 | 22500 | 35000 | 33000 | ohms  |
| Transconductance . . . . .          | 5300  | 6000  | 5300  | 5200  | μmhos |
| Load Resistance. . . . .            | 3000  | 2500  | 4500  | 4200  | ohms  |
| Total Harmonic Distortion. . . . .  | 9     | 10    | 11    | 15    | %     |
| Max.-Signal Power Output . . . . .  | 4     | 6.5   | 6.5   | 10.8  | watts |

### Cathode-Bias Operation

|                                        |      |      |      |       |
|----------------------------------------|------|------|------|-------|
| Plate Supply Voltage . . . . .         | 200  | 250  | 300  | volts |
| Grid-No.2 Supply Voltage . . . . .     | 200  | 250  | 200  | volts |
| Cathode Resistor . . . . .             | 186  | 167  | 218  | ohms  |
| Peak AF Grid-No.1 Voltage. . . . .     | 11.5 | 14   | 12.7 | volts |
| Zero-Signal Plate Current. . . . .     | 55   | 75   | 51   | ma    |
| Max.-Signal Plate Current. . . . .     | 56   | 78   | 54.5 | ma    |
| Zero-Signal Grid-No.2 Current. . . . . | 4.2  | 5.4  | 3    | ma    |
| Max.-Signal Grid-No.2 Current. . . . . | 5.6  | 7.2  | 4.6  | ma    |
| Load Resistance. . . . .               | 3000 | 2500 | 4500 | ohms  |
| Total Harmonic Distortion. . . . .     | 9    | 10   | 11   | %     |
| Max.-Signal Power Output . . . . .     | 4    | 6.5  | 6.5  | watts |

## Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation . . . . . 0.1 max. megohm  
For cathode-bias operation . . . . . 0.5 max. megohm

## AF POWER AMPLIFIER — Class A<sub>1</sub>

Triode Connection — Grid No.2 Connected to Plate

## Maximum Ratings, Design-Maximum Values:

PLATE VOLTAGE. . . . . 450 max. volts  
PLATE DISSIPATION. . . . . 30 max. watts

## PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. . 200 max. volts  
Heater positive with respect to cathode. . 200★ max. volts



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## Typical Operation and Characteristics:

|                                       | Fixed<br>Bias | Cathode<br>Bias |            |
|---------------------------------------|---------------|-----------------|------------|
| Plate Supply Voltage. . . . .         | 250           | 250             | volts      |
| Grid-No.1 (Control-Grid) Voltage. . . | -20           | -               | volts      |
| Cathode Resistor. . . . .             | -             | 490             | ohms       |
| Peak AF Grid-No.1 Voltage . . . . .   | 20            | 20              | volts      |
| Zero-Signal Plate Current . . . . .   | 40            | 40              | ma         |
| Maximum-Signal Plate Current. . . . . | 44            | 42              | ma         |
| Plate Resistance (Approx.). . . . .   | 1700          | -               | ohms       |
| Amplification Factor. . . . .         | 8             | -               |            |
| Transconductance. . . . .             | 4700          | -               | $\mu$ mhos |
| Load Resistance . . . . .             | 5000          | 6000            | ohms       |
| Total Harmonic Distortion . . . . .   | 5             | 6               | %          |
| Maximum-Signal Power Output . . . . . | 1.4           | 1.3             | watts      |

## Maximum Circuit Values:

|                                     |          |        |
|-------------------------------------|----------|--------|
| Grid-No.1-Circuit Resistance:       |          |        |
| For fixed-bias operation. . . . .   | 0.1 max. | megohm |
| For cathode-bias operation. . . . . | 0.5 max. | megohm |

## PUSH-PULL AF POWER AMPLIFIER — Class A<sub>1</sub>

### Maximum Ratings, Design-Maximum Values:

|                                            |      |      |       |
|--------------------------------------------|------|------|-------|
| PLATE VOLTAGE. . . . .                     | 500  | max. | volts |
| GRID-No.2 (SCREEN-GRID) VOLTAGE. . . . .   | 450  | max. | volts |
| GRID-No.2 INPUT. . . . .                   | 5    | max. | watts |
| PLATE DISSIPATION. . . . .                 | 30   | max. | watts |
| PEAK HEATER-CATHODE VOLTAGE:               |      |      |       |
| Heater negative with respect to cathode. . | 200  | max. | volts |
| Heater positive with respect to cathode. . | 200* | max. | volts |

## Typical Operation and Characteristics:

Unless otherwise specified, values are for 2 tubes

|                                                        | Fixed Bias |       | Cathode Bias |      |            |
|--------------------------------------------------------|------------|-------|--------------|------|------------|
| Plate Supply Voltage. . . . .                          | 250        | 270   | 250          | 270  | volts      |
| Grid-No.2 Supply Voltage. . . . .                      | 250        | 270   | 250          | 270  | volts      |
| Grid-No.1 Voltage . . . . .                            | -16        | -17.5 | -            | -    | volts      |
| Cathode Resistor. . . . .                              | -          | -     | 124          | 124  | ohms       |
| Peak AF Grid-No.1-to-                                  |            |       |              |      |            |
| Grid-No.1 Voltage . . . . .                            | 32         | 35    | 35.6         | 28.2 | volts      |
| Zero-Signal Plate Current. . . . .                     | 120        | 134   | 120          | 134  | ma         |
| Max.-Signal Plate Current . . . . .                    | 140        | 155   | 130          | 145  | ma         |
| Zero-Signal Grid-No.2                                  |            |       |              |      |            |
| Current . . . . .                                      | 10         | 11    | 10           | 11   | ma         |
| Max.-Signal Grid-No.2                                  |            |       |              |      |            |
| Current . . . . .                                      | 16         | 17    | 15           | 17   | ma         |
| Plate Resistance (Approx.,<br>per tube) . . . . .      | 24500      | 23500 | -            | -    | ohms       |
| Transconductance (Per tube). . . . .                   | 5500       | 5700  | -            | -    | $\mu$ mhos |
| Effective Load Resistance<br>(Plate to plate). . . . . | 5000       | 5000  | 5000         | 5000 | ohms       |
| Total Harmonic Distortion . . . . .                    | 2          | 2     | 2            | 2    | %          |
| Max.-Signal Power Output. . . . .                      | 14.5       | 17.5  | 13.8         | 18.5 | watts      |



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## Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation. . . . . 0.1 max. megohm  
For cathode-bias operation. . . . . 0.5 max. megohm

## PUSH-PULL AF POWER AMPLIFIER — Class AB<sub>1</sub>

Maximum Ratings, Design-Maximum Values:

PLATE VOLTAGE . . . . . 500 max. volts  
GRID-No.2 VOLTAGE . . . . . 450 max. volts  
GRID-No.2 INPUT . . . . . 5 max. watts  
PLATE DISSIPATION . . . . . 30 max. watts  
PEAK HEATER-CATHODE VOLTAGE:  
Heater negative with respect to cathode . 200 max. volts  
Heater positive with respect to cathode . 200★ max. volts

## Typical Operation:

Values are for 2 tubes

|                              | Fixed Bias |      |      | Cathode Bias |       |
|------------------------------|------------|------|------|--------------|-------|
| Plate Supply Voltage. . . .  | 360        | 450  | 450  | 360          | volts |
| Grid-No.2 Supply Voltage. .  | 270        | 350  | 400  | 270          | volts |
| Grid-No.1 (Control-Grid)     |            |      |      |              |       |
| Voltage♣. . . . .            | -22.5      | -30  | -37  | -            | volts |
| Cathode Resistor. . . . .    | -          | -    | -    | 248          | ohms  |
| Peak Af Grid-No.1-to-        |            |      |      |              |       |
| Grid-No.1 Voltage . . . .    | 45         | 60   | 70   | 40.6         | volts |
| Zero-Signal Plate Current. . | 88         | 95   | 116  | 88           | ma    |
| Max.-Signal Plate Current .  | 132        | 194  | 210  | 100          | ma    |
| Zero-Signal Grid-No.2        |            |      |      |              |       |
| Current . . . . .            | 5          | 3.4  | 5.6  | 5            | ma    |
| Max.-Signal Grid-No.2        |            |      |      |              |       |
| Current . . . . .            | 15         | 19.2 | 22   | 17           | ma    |
| Effective Load Resistance    |            |      |      |              |       |
| (Plate to plate). . . . .    | 6600       | 6000 | 5600 | 9000         | ohms  |
| Total Harmonic Distortion .  | 2          | 1.5  | 1.8  | 4            | %     |
| Max.-Signal Power Output. .  | 26.5       | 50   | 55   | 24.5         | watts |

## Maximum Circuit Values:

Grid-No.1-Circuit Resistance:♣

For fixed-bias operation. . . . . 0.1 max. megohm  
For cathode-bias operation. . . . . 0.5 max. megohm

## PUSH-PULL AF AMPLIFIER — Class AB<sub>2</sub>

Maximum Ratings, Design-Maximum Values:

PLATE VOLTAGE. . . . . 500 max. volts  
GRID-No.2 (SCREEN-GRID) VOLTAGE. . . . . 450 max. volts  
GRID-No.2 INPUT. . . . . 5 max. watts  
PLATE DISSIPATION. . . . . 30 max. watts  
PEAK HEATER-CATHODE VOLTAGE:  
Heater negative with respect to cathode. . 200 max. volts  
Heater positive with respect to cathode. . 200★ max. volts



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## Typical Operation:

*Values are for 2 tubes*

|                                                         | Fixed Bias |             |
|---------------------------------------------------------|------------|-------------|
| Plate Voltage. . . . .                                  | 360        | 360 volts   |
| Grid-No.2 Voltage. . . . .                              | 225        | 270 volts   |
| Grid-No.1 (Control-Grid) Voltage <sup>▲</sup> . . . . . | -18        | -22.5 volts |
| Peak AF Grid-No.1 to Grid-No.1 Voltage. . . . .         | 52         | 72 volts    |
| Zero-Signal Plate Current. . . . .                      | 78         | 88 ma       |
| Max.-Signal Plate Current. . . . .                      | 142        | 205 ma      |
| Zero-Signal Grid-No.2 Current. . . . .                  | 3.5        | 5 ma        |
| Max.-Signal Grid-No.2 Current. . . . .                  | 11         | 16 ma       |
| Effective Load Resistance (Plate to plate). . . . .     | 6000       | 3800 ohms   |
| Peak Grid-Input Power <sup>◆</sup> . . . . .            | 140        | 270 mw      |
| Total Harmonic Distortion. . . . .                      | 2          | 2 %         |
| Max.-Signal Power Output . . . . .                      | 31         | 47 watts    |

## Maximum Circuit Values:

### Grid-No.1-Circuit Resistance:◆

|                                      |                 |
|--------------------------------------|-----------------|
| For fixed-bias operation . . . . .   | 0.1 max. megohm |
| For cathode-bias operation . . . . . | Not recommended |

- ▲ Without external shield.
- On the 6-pin bases, pin 1 as well as pin 6 is omitted.
- ★ The dc component must not exceed 100 volts.
- ◆ In push-pull circuits where grid No.2 of each tube is connected to a tap on the plate winding of the output transformer, it is permissible for this voltage to be as high as 500 volts.
- ◆ The type of input coupling used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.
- ◆ Driver stage should be capable of supplying the specified driving power at low distortion to the No.1 grids of the AB<sub>2</sub> stage. To minimize distortion, the effective resistance per grid-No.1 circuit of the AB<sub>2</sub> stage should be held at a low value. For this purpose, the use of transformer coupling is recommended.

## OPERATING CONSIDERATIONS

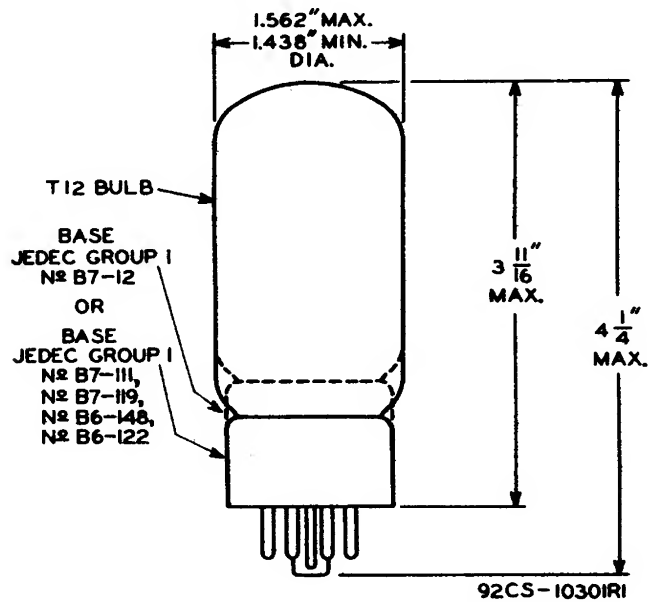
The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided.



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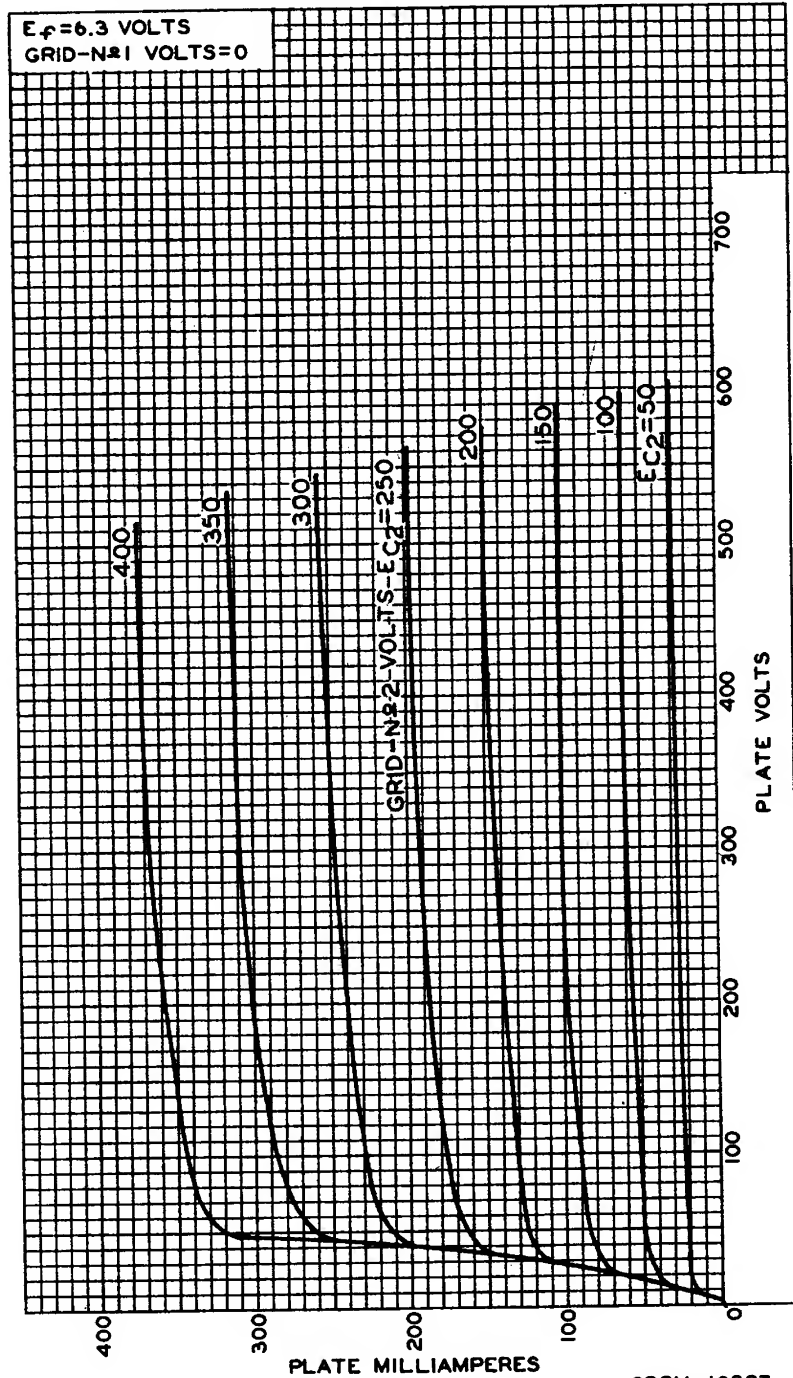
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## AVERAGE PLATE CHARACTERISTICS

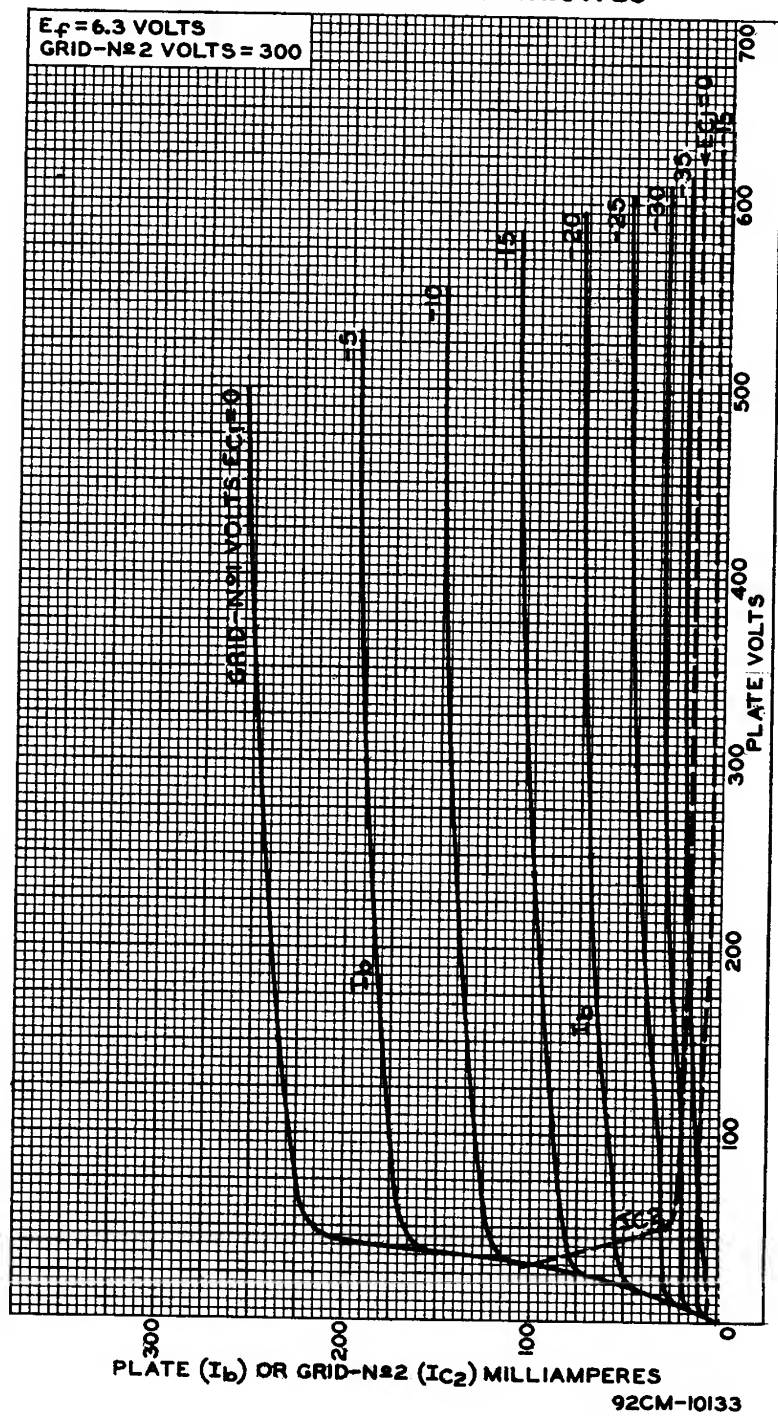


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## AVERAGE CHARACTERISTICS



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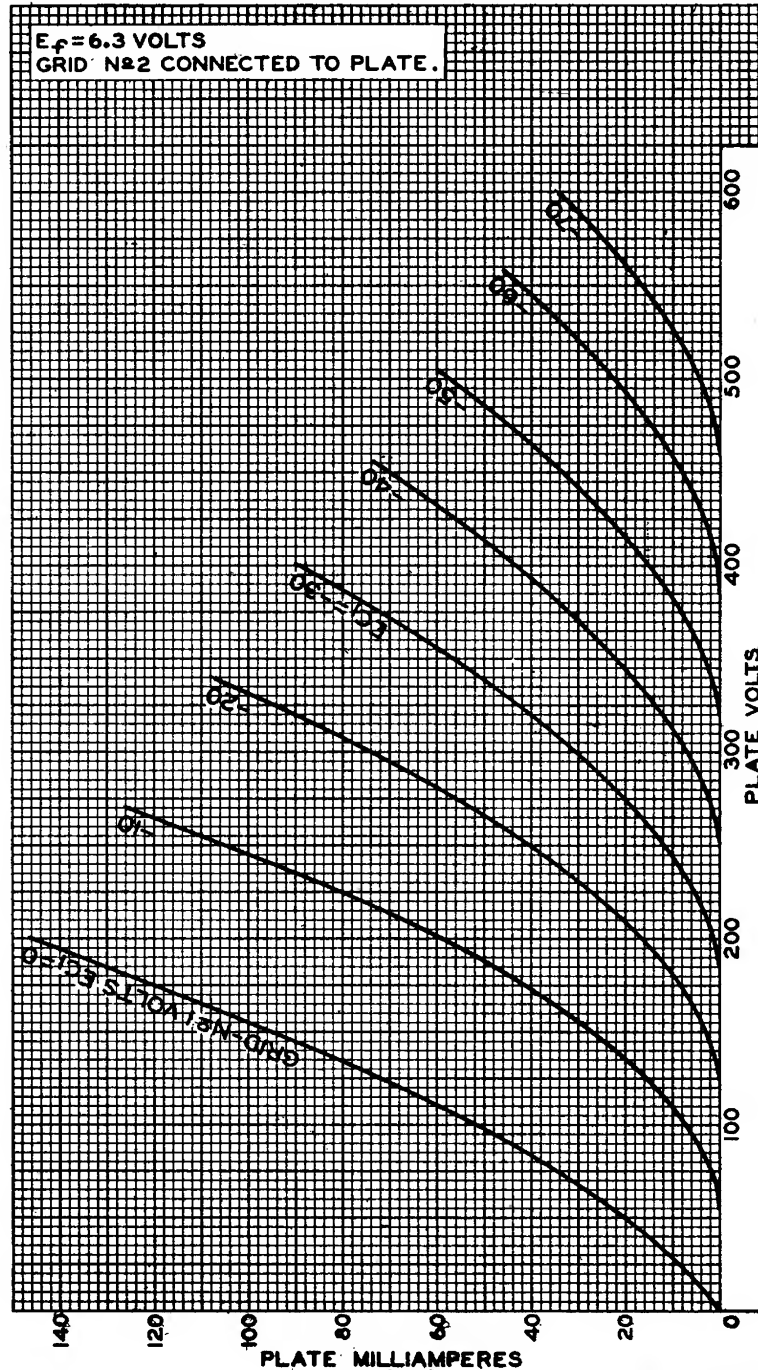
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## AVERAGE PLATE CHARACTERISTICS Triode Connection



92CM-9568

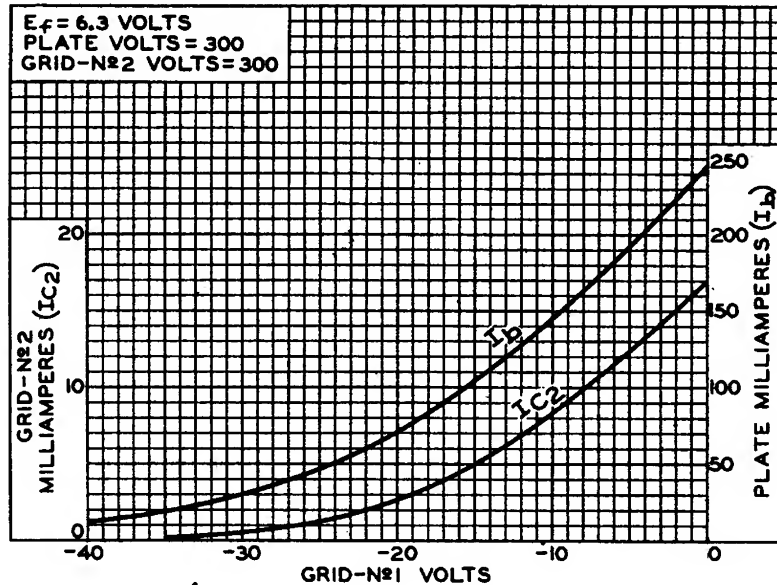


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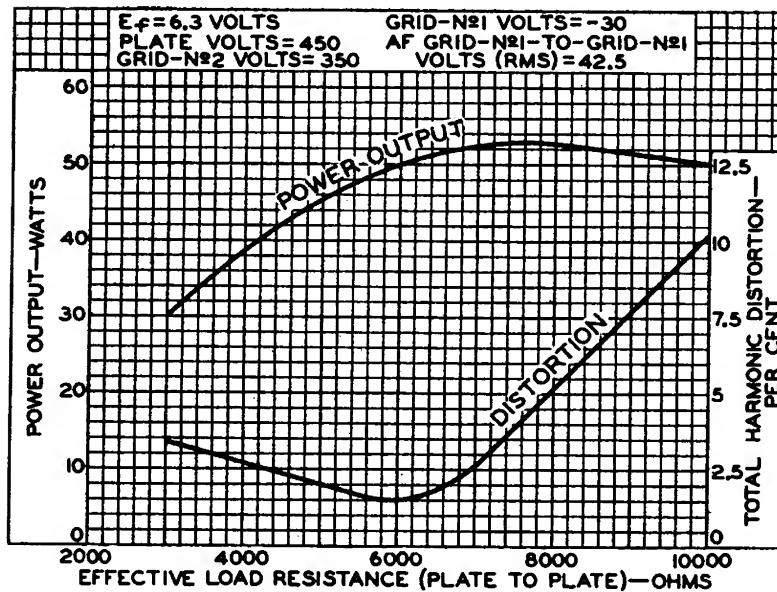
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## AVERAGE CHARACTERISTICS



92CS-10126

## OPERATION CHARACTERISTICS Push-Pull Class AB $_1$



92CS-9575

